

INDUSTRIAL EXPERIENCE

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NEW REFRACTORIES PRODUCED BY PODOL'SKOGNEUPOR JSC

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A wide range of high-quality refractories for the integrated equipment of glass-making furnaces is offered.

The Podol'skogneupor JSC implements a consistent policy of industrial development of special refractories for glass-melting furnace meeting all requirements of the contemporary glass production.

The aim of glass manufacturers is to lower as much as possible the production cost by reducing energy consumption. To reduce heat losses via waste gases, it is advisable to switch from the checkerwork made of standard rectangular bricks to the checkerwork consisting of pot-shape blocks (Fig. 1), which allows for fuel saving up to 15%. These blocks have good steadiness and are easy to handle with a high accuracy of installation.

The Podol'skogneupor company has developed such pot-shaped checkerwork of grades MLS-62, MKS-72, and BKTN (Table 1). The thermal resistance of this checkerwork (950°C – air) is at least 5 thermal cycles.

To reduce heat losses, it is necessary as well to ensure reliable thermal insulation for all furnace elements. At present we can offer to glass manufacturers an expanded range of lightweight products with improved parameters (Table 2).

Having focused special attention on the production of lightweight materials with high mechanical strength, we

have developed not only heat-insulating, but construction materials as well, which can be used for thermal insulation even in the bottom of a glass melting tank. The company is currently developing tiles for thermal insulation of the melting tank walls.

To improve thermal insulation and extend its service life, many contemporary furnaces are designed with a double bottom consisting of bottom bars ShSU-33 and MLS-62 (Table 3). These types of refractories are manufactured at the Podol'skogneupor Company.

In 2003 the company started the operations of cutting and grinding of glass bars. This makes it possible to expand the range of block products, to ensure minimal clearances between them, and to decrease the time needed for repair and assembly works.

Furthermore, the technology of producing large-size glass bars MLS-62 has been developed and successfully implemented. Using grinding and cutting of blocks, the company successfully manufactures bottom bars of this grade in

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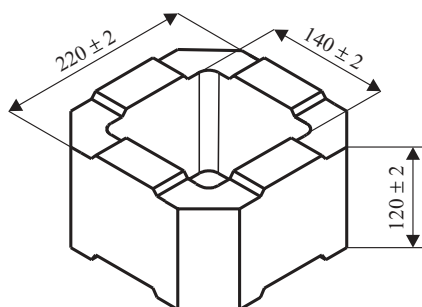


Fig. 1. Pot-shaped checkerwork.

TABLE 1

| Parameter | Pot-shaped checkerwork | | |
|---|------------------------|--------|------|
| | MLS-62 | MKS-72 | BKTN |
| Mass content, %: | | | |
| Al ₂ O ₃ , more than | 62.0 | 72.0 | – |
| Fe ₂ O ₃ , not more | 1.5 | 1.5 | – |
| ZrO ₂ , at least | – | – | 21.0 |
| SiO ₂ , not more | – | – | 20.0 |
| Open porosity, %, not more | 20 | 20 | 17.0 |
| Compressive strength, MPa, at least | 50 | 55 | 45 |
| Softening temperature, °C, at least | 1450 | 1500 | 1500 |
| Additional linear shrinkage, %, not more, at temperature, °C: | | | |
| 1400 | – | – | – |
| 1500 | 0.4 | – | – |
| 1600 | – | 1.0 | 1.0 |

TABLE 2

| Lightweight product | Apparent porosity, g/cm ³ , not more | Compressive strength, MPa, at least | Thermal conductivity, W/(m · K), not more, for average temperature 350 ± 25°C | Service temperature, °C |
|---------------------|---|-------------------------------------|---|-------------------------|
| ShL-1.3 | 1.30 | 15 | 0.60 | 1300 |
| ShL-1.0 | 1.00 | 10 | 0.50 | 1250 |
| ShL-0.9 | 0.90 | 10 | 0.40 | 1250 |
| ShL-0.6 | 0.60 | 5 | 0.30 | 1150 |
| ShL-0.45 | 0.45 | 3 | 0.25 | 1100 |

accordance with customers' blueprints and performs their assembly. Such refractories have been supplied to the OSTARA Company, Kamyshinskii Glass Container Works, Seversteklo JSC, Chagodoshchenskii Glass Factory, Dmitrovskii Works of Thermal Insulation Products, Belstekloprom Company, Gomel'steklo JSC, etc.

In April 2003 the Podol'skogneupor started a new group of products, i.e., refractories for feeders and working zones of glass-melting furnaces.

The company is capable of supplying refractory sets for all modifications of feeders, including imported section-type machines and domestic feeders.

Refractories for the feeders and working zones of glass-melting furnaces and for individual elements of the upper structure of the melting tank can be supplied as a complete set or as parts of refractory brickwork.

The set of refractory products for feeder brickwork includes the feeder channel, refractories for the upper part of the feeder (different types of burner stones, plates, bars, etc.), and drop-forming feeder elements (bowl, cylinder, plunger, cinder notch).

For different service conditions the company makes high-alumina refractories containing from 60 to 90% Al₂O₃

TABLE 3

| Parameter | Bottom bar | |
|---|------------|--------|
| | ShSU-33 | MLS-62 |
| Mass content, %: | | |
| Al ₂ O ₃ , at least | 33.0 | 62.0 |
| Fe ₂ O ₃ , not more | 1.8 | 1.5 |
| Open porosity, %, not more | 18 | 24 |
| Compressive strength, MPa, at least | 25 | 25 |
| Additional linear shrinkage, %, not more, at temperature, °C: | | |
| 1400 | 0.4 | — |
| 1500 | — | 0.4 |
| Softening temperature, °C, at least | — | 1450 |

of any complexity and any configuration, weighing from 1 to 500 kg, of length up to 1600 mm.

Since the moment when the refractories for feeders and working zones of glass-melting furnaces have been put into production, the list of our customers has grown to include over 30 glass factories in Russia and CIS countries, including the GUTA JSC, Vol'nogorskoe Steklo JSC, Gostomel'skii Glass Factory, etc.

In 2000 the Podol'skogneupor JSC resumed the production of melted-cast baddeleyite-corundum refractories BK-33, BK-37, and BK-41. At present the company produces a full range of BK products and performs the assembly of all units.

Due to the wide product range and the high quality of products, the Podol'skogneupor JSC offers integrated supplies of all refractories for the glass-melting furnace brickwork.

The experience of producing diverse products for all sectors of industry, as well as the knowledge and expertise of our specialists constitute a reliable basis for steady performance of our company, enabling us to expand the product range and improve the product quality.